3D Printed Electroluminescent Light Panels - FY17

Completed Technology Project (2016 - 2017)

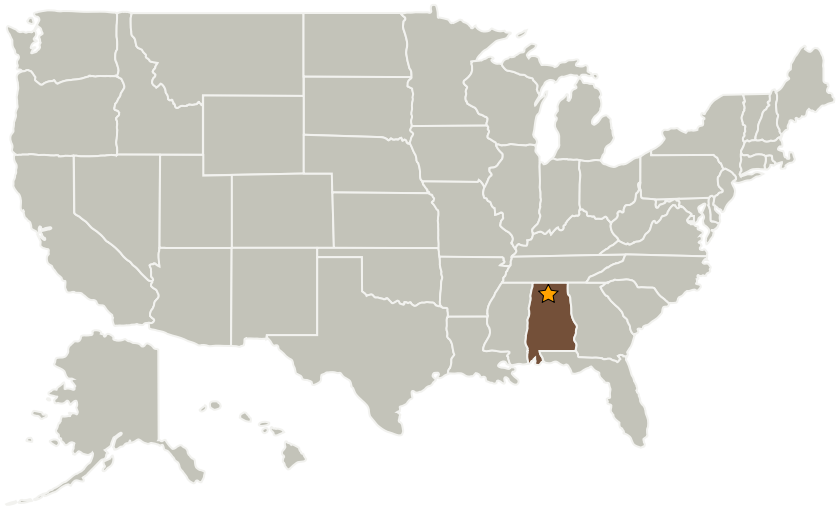
Project Introduction

Task 1: Construct EL devices using both commercially available inks and MSFC developed inks starting with screen-printing methods as a baseline Task 2: Quantitatively compare the devices and measure the improvements (if any) that are gained by using MSFC nano-materials over commercial materials Task 3: Convert best inks from thick film (used for screen printing) to thin film (suitable for aerosol-jet printing)Task 4: Develop a particle-free Indium Tin Oxide (ITO) ink to allow for the printing of transparent, conductive electrodes using [1]Task 5: Switch from a "front to back" method printing on a conductive-coated plastic sheet (conventional method) to a "back to front" method using the ITO ink as the front electrode/window Year 1 Deliverables: Aerosol-Jet printed EL device printed using "back to front" method.

Anticipated Benefits

The goal of this project is to create the inks for electroluminescent (EL) devices that can be embedded onto many surfaces. This concept was incubated as a result of the desire to embed identification patches on astronaut space suits, so that at a glance astronauts could identify other astronauts in their suits. This is particularly important in the Martian environment where dust storms are frequent. The technology will be applicable to in-situ construction of future planetary habitats. The current state of the art is deficient in regards to printing EL devices; namely, the reliance on a prepared surface coated with a transparent conductor and the inks used for the rest of the device (conductor inks, phosphor inks, and dielectric inks).

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations
Alabama

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Center Innovation Fund: MSFC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

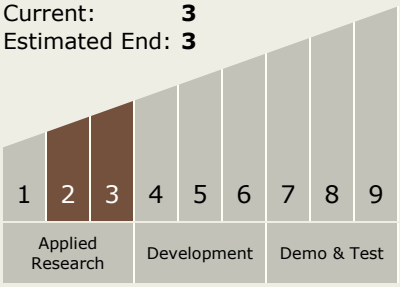
John W Dankanich

Principal Investigator:

Ian K Small

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.2 In-Situ Manufacturing, Maintenance, and Repair

Target Destinations

Earth, The Moon, Mars